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Abstract

The paper aims to develop a new typology of Internet users on basis of a recently conducted telephone survey in Austria (January 2007, N=529, representative sample). In comparison to existing typologies, we elaborate our typology not by concentrating on duration or frequency of internet usage but by location of usage. Considering the location of usage, we can get hints about peoples motivation and interest in the internet, their types of usage and their internet literacy. The typology is validated by using elements of the Theory of planned behaviour. We can confirm the strong influence of the main determinants on behaviour as postulated by the Theory of planned behaviour, namely attitudes toward behaviour, behavioural control and social norms. By concentrating on individual behaviour, our approach is settled on the micro-level of explanation of collective phenomena. Thus our results can be embedded in a larger, multilevel model of collective behaviour.

Keywords: internet user typology, theory of planned behaviour, empirical study

Introduction

There have been various approaches in building typologies of internet users and non-users in digital divide research (Howard et.al. 2001, Katz et. al. 2001, Rice et. al. 2003). Scientists try to identify such schemes mainly in order to observe theories of diffusion and to help practitioniers working in action programs to get to know their target groups better. These typologies vary in the sense they include variables ranging from demographics to usage behaviour and attitude patterns.

Our research group is privileged to work with very "fresh" data, which allows us to present up-to-date results on the situation in Austria. We have tried to elaborate a more in-depth study of internet usage and digital divide in Austria compared to existing surveys e.g. the Austrian Internet Monitor or the Austrian Web analysis. In comparison to European or even international efforts, Austria does quite well in connecting more and more people to the internet (Demuter 2006, European Commission 2005, Chinn and Fairlie 2004). Although we have found that 61% of people in our representative sample were internet users, we found a quite large proportion of respondents who neither are online nor are planning to do so. In this sense there is need to continue to ask research questions in the study of digital divide: the development of a typology can give hints about the structure and attitude patterns of Users and Non-Users.

We have decided to validate the developed typology by using elements of the Theory of planned behaviour (Ajzen 1991) and in its extension the multilevel model of explaining collective behaviour (Esser 1999). Our types vary in their location of usage and their intentions to get online, which distinguishes our typology from others. Because of this fact, we were looking for a behavioural theory to validate our categories.

The aims of our paper are in this sense:
- to build a meaningful and valid typology of internet users and non users
- to get an idea of the demographic characteristics of our types
- to validate our types in taking account of variables that might have led to their behaviour (elements of theory of planned behaviour)

A theoretical framework for analysing internet usage

Our analysis is based on the theoretical framework of Max Weber's model (2002) of causal explanation ("verstehendes Erklären") and its further developments by Coleman (1990), Boudon (1980), Esser (1999) and others. Social phenomena on the macro level of society can only be explained substantially by choosing a "circuit" towards individual behaviour on the micro level of society. When Weber (2002) described the coherence of the protestantic ethic and the "spirit" of capitalism he was first to apply such a multilevel-model of explanation. The model (figure 1) can be expanded in a horizontal way (in implying an extension through a chronological perspective) and in a vertical way (in implying more levels e.g. a meso level of institutions). Because of the indirect explanation of collective phenomena, there are mainly three paths which have to be defined in detail. The first path from macro to micro level is called "logic of situation" (defining salient sets of possible actions) its counterpart from micro to macro level is called "logic of aggregation" (aggregating individual behaviour to macro level). The most complex definition has to be made on micro level, where the actor selects between various action alternatives (logic of selection).
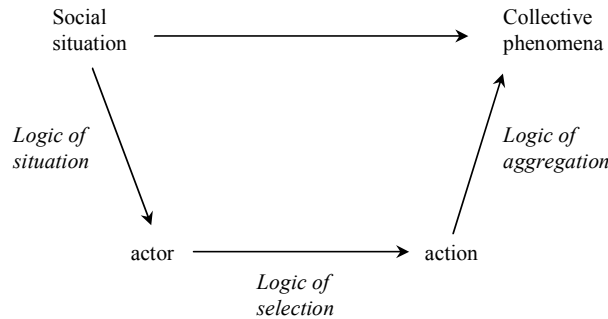
Figure 1: Multilevel Model (Lesser 1999)

In implying those considerations to our situation we can redefine the model up to our purpose as is shown in figure 2. Thus explaining the acceptance of technical innovations resulting in growth rates of purchase and usage, we have to follow the arrows down to the micro level, where the individual behaviour is settled. In our case and for simplification we focus only on the two alternatives of using and not using the internet.

Figure 2: A multilevel model explaining growing internet usage

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The decision about choosing an action or not (logic of selection) is of obvious importance for the model so that we focused our attention to this element of the model. A behavioural theory has to be applied in this section. A quite promising approach seems to be the Theory of planned behaviour (Ajzen 1991) which takes both in account: the *homo oeconomicus* with its rational thinking and the *homo sociologicus*, always considering the boundaries the society imposes on him (Kunz 1997, Bamberg et. al. 2000). The main determinants of behaviour in this model are attitudes, behavioural control and social norms influencing behavioural intentions and behaviour.

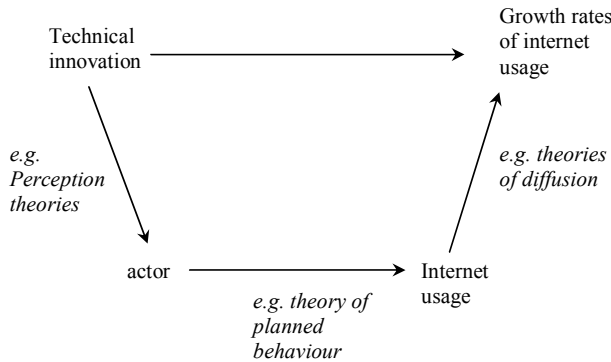Applying this model to our situation, we can reformulate the determinants as shown in figure 4. Albeit we have decided not to develop a full model in the sense of the Theory of planned behaviour (which would include evaluations and expectancy values for each predictor component), our data set provides us with some general impressions about the importance of the main determinants of the model. We operationalized "attitudes" by conducting a semantic differential on attitudes towards the internet. Several questions on internet-, computer- and English literacy served as indicators for behavioural control and finally the influence of social norms was operationalized by asking for internet usage in salient reference groups like family, friends and colleagues.

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           Attitude
                  \
                   \
                    ↘
           literacy  →  Plans to  →  Internet usage
                         get
                    ↗    online
                   /
                  /
          Social
          norms
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Figure 4: A model for analyzing internet usage

State of the art on typologies of users and non-users

Our research aims to develop and validate a new typology of Users and Non-users which should overcome some shortcomings of existing typologies. The typology of Katz et.al. (2001) is a rather prominent one, which builds on the point in time, when respondents first used the internet. This approach yielded in following typology:
- Long term users: persons using the internet for more than one year
- Recent users: persons who began using the internet during the last 12 months
- Former users: persons who are no longer using the internet
- Non users: persons who are aware of the existence of the internet but never used it
- Total non users: persons who have never heard of the internet before and have never used the internet

Today, six years later, we cannot talk of Long term users any longer when defining them as being online more than one year. Another shortcoming seems to be the usage of the variable "point of time getting online first" for typology building in general. We have tried to avoid this question, because this retrospective question can have memory effects considering respondents answers. Quite similar to the typology of Katz et.al. (2001) is the typology of Rice (2003) which is also based on point in time of first getting online. Rice developed three categories with two groups each. The respondents then were categorized in one group per category:
- Non-users versus Current users
- Veteran users (more than 3 years online) versus Recent users
- Drop-outs versus current Users

Rice found that Non-users are mainly deprived persons (elderly, women, low income and education) in comparison to the Current users. Recent users, in comparison to Veteran users, showed likewise such demographic characteristics. In opposition to these two deprived groups, the drop-outs are younger but also score low on education and income variables.

Howard et.al. (2001) built a typology which consists only of current users and does not include Non-Users. In criticizing the usage of demographic variables in typology building, they relied also on the question "How long have you had internet access?" combined with the daily frequency of internet usage. This approach resulted in four groups which can be described as follows:

- Newcomers: less than one year internet experience
- Experimenters: one to two years internet experience
- Utalitarians: daily internet usage and at least two years online
- Netizens: daily internet usage and at least three years online

The "Newcomers" included 30% of America's internet population in 2003. This group is especially interested in "fun activities" on the internet and uses the internet either in their workplace or at home but not at both places. The "Experimenters" (26% of America's internet population in 2003) use the internet for information gathering in addition to using it for "fun activities". "Utilitarians" (28% of America's internet population in 2003) show rather pragmatic usage behaviour and have already integrated the internet in their daily business and lives. The "Netizens" (16% of America's internet population in 2003) have integrated the internet fully in their lives. They are using the internet for e-commerce and communication via the internet is taken for granted by them. Howard's typology seems quite applicable and modern to us, because it recognizes the importance of having access at home. Besides it also works with "duration of access" as a basic variable, which we wanted to avoid in our typology as already mentioned.

Methodology

We conducted our survey in January 2007 by telephone interviews, in order to reach both Users and Non-Users. Respondents in our survey were chosen by the CATI-System (Computer Aided Telephone Interview) "Askme" via random sampling. The duration of an interview was an average of 12 minutes, which helped to minimize the number of dropouts. The questionnaire was fully standardized, pre tested and developed after a phase of qualitative interviews, which provided as useful data about general attitudes towards the internet. The survey combined already tested scales and newly developed scales and gave special attention to commensurability with existing survey programs and data sets in Europe. Respondents started with general questions of internet access and usage, than answered questions about internet in their social environment and computer literacy. We also asked about reasons for usage and non-usage and general attitudes towards the internet. Questions about technophobia, planned purchase of an internet access and of course demographics completed the questionnaire.

Sample description and descriptive results

Our sample includes 529 persons and slightly more women compared to the Austrian population census. Age and region fit nearly perfectly with the distribution of the population census with slightly more older than younger respondents. Summarized, our sample shows in comparisons with the population census a very high quality. 57,8% of our respondents are women, most respondents are in the age group of 45-64 years (37%). Referring to education, 41, 6% of our respondents have no high school diploma (table 1).

Table 1: Sample description

Gender	%	Age	%	education	%
male	42,2	15 - 25 years	9,4	compulsory education	17,7
female	57,8	26 - 44 years	34,2	without high school diploma	41,6
		45 – 64 years	37,0	with high school diploma (~A-level)	24,8
		65 years +	19,5	University	15,8

61% of the respondents currently use the internet (figure 5). Growth rates for internet access at home in Austria are still

increasing but the speed of the growth seems to have slowed down a bit during the last 5 years. Most users (82%) use the internet at home and about two third are daily users. Mobile usage of internet via wireless is still at its beginnings with 11% of the users reporting to use this kind of access. Main activities on the internet include sending and receiving e-mails, searching for study materials and communicating with friends and family. Using the internet for work only ranked at fourth place. E-government and shopping on the internet are still quite unusual for nearly two third of the Austrian users. Quite interestingly, we have also found that 73% of the users rated their English skills weak to medium.

About 2% of our respondents can be described as "drop-outs" who have used the internet but are currently off-line. Only 9,5% of the Non-Users (39%, thus 206 respondents) are planning to get internet-access at home during the next two years.[1] Besides having no computer and/or no internet access at home, non-users state that a lack of interest, difficulty using the computer or internet and uselessness of the internet are the main reasons for not using the internet. Another important barrier, the lack of computer literacy, was the fourth most frequently mentioned reason for non-use.
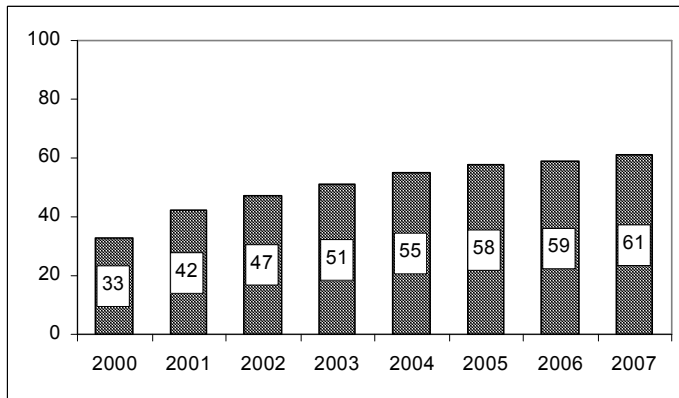

Figure 5: Percentage of Internet Users in Austria
(source: 2000-2006 Austrian Internet Monotot (AIM), 2007 own survey)

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[1] We used a time frame of two years as a reference point, to ease this hypothetical question for our respondents and tried to stay as close and clear as possible in formulation to the behaviour we are interested in (getting an internet access).

Results

4.1. A typology of Users and Non-Users

Building typologies has long been one of the main goals in social sciences research. The aim of typology building is clearly to search for types which are distinct to one another (heterogeneity) but as homogenous as possible inside (between elements). Lazarsfeld (1972) described quite early two main ways to develop typologies which can be summarized as reduction and substruction. In using substruction the researcher searches for variables which underlie an existing, "finished" typology. The opposite "reduction" examines a typology in using a given set of categories. In applying the reduction approach to our data set, we combined three variables in a cross-tabulation and checked each combination for its meaningfulness and for the number of cases in cells. This procedure is described by Lazarsfeld (1972) in the following way: "*Some of these types can be the original combinations, others can be formed by merging several of the original cells. It is possible that some of the original combinations will not appear in the final typology because, for empirical or logical reasons, they can be dismissed. This process of moving from combinations to types is called reduction.*" What really seems appealing to us in this kind of approach is the substantive need to combine logical and empirical reasons in typology building by implying a rather parsimonious way of making use of multivariate analysis.

In comparison to existing typologies we have elaborated our classification by considering usage behaviour and did not include demographics or attitude patterns. The advantage of this approach is that demographics can be used afterwards as sources of primary validation taking into account the results and knowledge we gained form previous studies. In this sense variables taken into account to build the typology have been internet usage, the place of internet usage and the intention to get an access at home. Using "location of internet access" as an constituting variable can give hints about:
- Motivation to use the internet, interest in the internet: people having an access at home may be more interested in internet usage
- Content of usage: we can assume that an access at work is mainly used for working reasons and an access at home is mainly used for private reasons, although there are of course also mixed types

On basis of these variables we found six groups of relations toward internet usage on three levels, using cross tabulation in the way Lazarsfeld suggested.
We differentiated between users (369 respondents; 69 %) and non-users (160 persons; 31 %) in the first step. The main group namely the users were then reclassified considering their place of access. Non-Users were subclassified in potential users (planning to get online in the next two years) and offliners (no intentions to get online). This approach yielded in a typology of these six groups (figure 6):

Users
- Private users: using the internet at home but not in their workplace (138 respondents; 26%)
- Work users: using the internet in their workplace (36 respondents; 7 %)
- Allround users: using the internet at home and in their workplace (165 respondents; 31%)
- Joint users: using the internet solely at their friends' and families' places and on public places; this group has no access at home or in their workplace (30 respondents, 5 %)

Non-Users
- Potential users: currently not using the internet, but planning to obtain access during the next two years (36 respondents, 7%)
- Offliners: not using the internet and not planning to get online during the next two years (124 respondents, 24%)
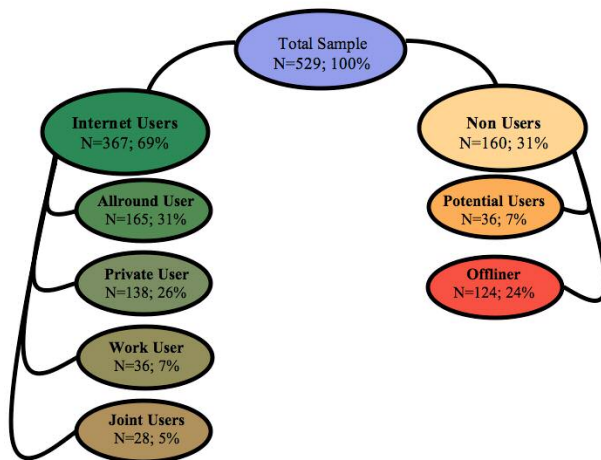
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Figure 6: Typology of internet usage

In confronting our typology with demographic variables we get first hints about the sociostructural composition of users and non users (table 2). Considering gender, we can observe that men are more represented in the groups of Work users and Allround Users. The distribution of age shows, that according to previous studies (Charness and Holley 2004), Offliners are mainly elder persons and that Allround users are the youngest group comparing the average age. Allround users and Work users have remarkably high levels of education. About two third of the Allround users have a high school diploma as opposed to the other extreme, the group of the Potential users in which 92% do not have a high school diploma. We also found a very low level of education in the group of the Offliners. In comparing regional effects we can observe that an above average number of Potential users can be found in provincial regions, which may be attributed to low network coverage. Comparing income, Allround users have the highest per capita household income, followed by the Work users and the leisure time users. Potential users and Joint users can be found at the end of the income distribution.

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Table 2: Types of Users and Non-Users compared by demographic characteristics

	Allround user	Private user	Work user	Joint user	Potential user	Offliners	Total
N	165	138	36	28	36	124	527
Percentage of N	31	26	7	5	7	24	100
Gender							
male	46,7	42,0	58,3	39,3	36,1	33,1	41,9
female	53,3	58,0	41,7	60,7	63,9	66,9	58,1
Age (average)	41,19	42,88	44,19	47,86	52,64	63,75	48,3
Education							
Without High school diploma	34,8	62,5	41,7	66,7	91,7	82,9	59,4
With High School diploma	65,2	37,5	58,3	33,3	8,3	17,1	40,6
Region*							
provincial	33,3	32,8	41,7	32,1	40	26,6	32,6
small cities	17,6	22,6	16,7	14,3	11,4	21,8	19,2
urban	49,1	44,5	41,7	53,6	48,6	51,6	48,2
Income**	1.377	1.080	1.268	948	810	1.020	1.148

*constructed using postal codes
**average per capita household income

Summarized, our results are in accordance with previous studies examining effects of age, gender, education, income and region on the digital divide (van Dijk 2003, Katz 2002, Norris 2001, Di Maggio 2003, Anderson 1995, and Wasserman et.al. 2005).

Types and their sources of behaviour
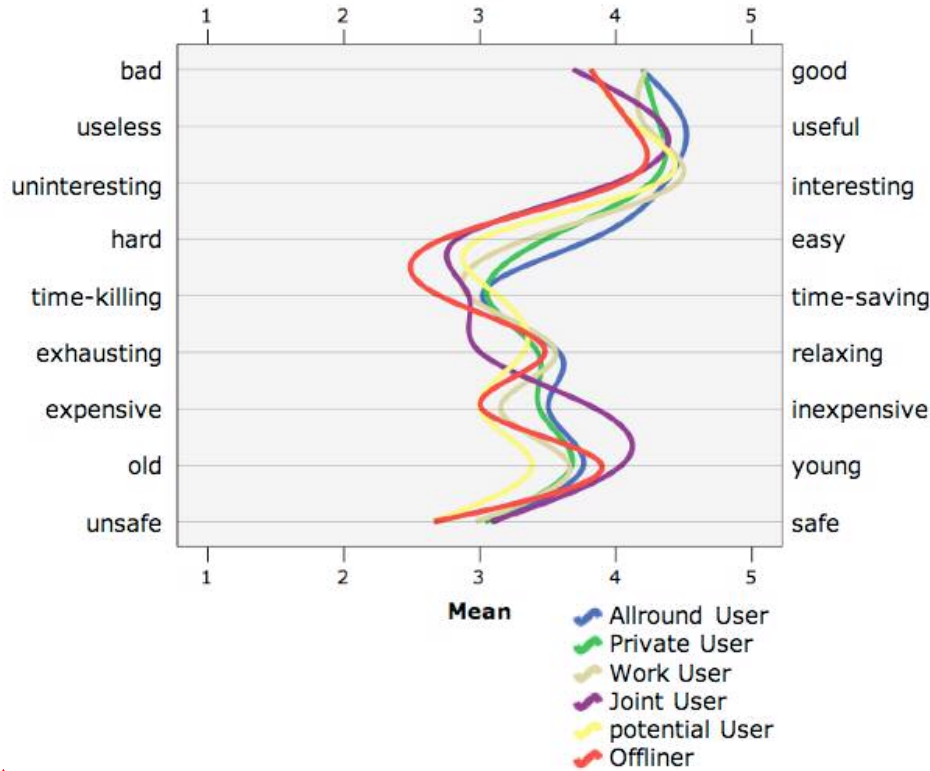
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Attitudes

According to the assumptions of the Theory of planned behaviour (Ajzen 1991) we were interested in general attitude patterns which could influence the respondent's attitudes towards using the internet. Respondents had to rate their perceptions about the internet by means of nine contrary attributes scaling on a five-point scale (semantic differential)[2]. Results are shown as group means (figure 7). Allround Users, who use the internet at home and at their workplace, score highest on the range of (positive) attitudes towards the internet. We can observe some interesting facts in comparing our groups:

- Joint users rate the internet quite often as cheap because they do not pay for a single access
- Offliners naturally describe the internet as difficult, time consuming and unsafe
- Potential users express similar objections, but describe the internet more often as interesting, which may explain their intention to get online
- Work users describe the internet more often as time consuming and expensive compared to Allround users which may be an explanation for them not having an access at home
- Private users score average on every attribute pair

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[2] We examined salient sets of attributes in a qualitative pre-study (N=20 open ended interviews in Autumn 2006).

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Figure 7: Attitude patterns of Users and Non-Users

Behavioural control: Internet literacy

A nearly perfect fit to the hypothesis of ordinal scaling level of our groups can be seen by combining the groups with their (self-rated) computer-, internet- and English literacy (table 3). Especially this combination can be seen as validation of our elaborated groups. In accordance to the Theory of planned behaviour, the four user groups should score highest on questions of literacy i.e. have the highest behavioural control in using the internet. Respondents were asked for a self-rating on a five-point-scale from zero "no skills" to four "excellent skills". We computed t-tests to check on significant differences in means. Due to the fact that Alpha-error cumulate in computing several paired comparisons we used Bonferroni-adjustment, which adjusts the Alpha-level downwards to consider chance capitalization in computing a coefficient of global error rate divided by number of tests.

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Table 3: Types of Users and Non-Users compared by their skills

	Allround user	Private user	Work user	Joint user	Potential users	Offliners	Total
Computer literacy mean	3,78	3,21*	3,4	2,96*	1,97*	1,44*	2,9
Internet literacy mean	3,86	3,28*	3,26*	2,54*	1,4*	1,16*	2,81
English literacy mean	3,56	3,2*	3,46	3,11	2,26*	2,24*	3,04

*significant differences compared to Allround users on $\alpha = 0,05$
Bonferroni adjustment on multiple comparisons, N= 529

Allround users score highest on our scale and show thus the best competences and skills as can be clearly seen. We can observe three non-significant differences in comparison to the reference group which can be explained by the quite good competences of Work users, who use internet and computer in their everyday work and the quite small group of Joint users which hinders the emergence of significant effects in general. The decrease of English skills is dramatic[3] especially for the last two groups the Potential users and the Offliners. Summarizing, differences in skills using internet and PCs can result in what is called a second-order digital divide and has been described by Hargittai (2002) in an impressive way. We found differences in skills between our user groups which influence their interest in using the internet massively.

Social norms

In the last step we compared our groups perceptions of internet usage in their social environment to illustrate possible ways of influence how the decision about use or non use of the internet could be influenced (table 4). Respondents were asked whether their family, friends and colleagues use the internet scaling from 1 equals "nearly everybody is using the internet" to 4 "nearly nobody uses the internet". In performing t-tests we found interesting differences compared to the means of our reference group "Allround users". Again we used Bonferroni adjustment to correct effects of multiple pair wise comparisons while computing T-Tests.

Table 4: Types of Users and Non-Users compared by their social environment

	Allround user	Private user	Work user	Joint user	Potential users	Offliners	Total
friends mean	1,36	1,58*	1,63*	1,81	2,41*	2,96*	1,89
colleagues mean	1,28	1,73*	1,31	2,35*	2,09*	3,22*	1,84
Family mean	1,91	1,79	2,53*	2,12	2,06	2,33*	2,04

*significant differences compared to Allround users on $\alpha = 0,05$
Bonferroni adjustment on multiple comparisons, N= 529

Allround users have greatest number of other internet users in their social environment. Only in the category "family", Private users have significantly more users in their social network. Work users are significantly different in the categories "friends" and "family" to the Allround users. The low number of colleagues using the internet can be seen as one possible explanation for the constitution of the group "Joint users". Compared to the Allround users, Offliners have least internet users in their social environment, followed by the potential users. Potential users have a considerably large number of users in their families which can be interpreted as a fact which influences the intention to get online. Besides we can observe an interesting

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[3] The spoken language in Austria is German.

effect of the first two variables which reflect the latent ordinal scaling level of our user groups, resulting in increasing values from the left to the right of the table. The family influence on internet usage does not show this effect and thus lies on another dimension. Thus we can conclude a major influence of reference groups (especially secondary reference groups as friends and colleagues) on the decision of getting online. Such influences have also been found by Stanley (2003), DiMaggio et.al. (2003) and Hargittai (2003).

Conclusions

Contrasting our typology with the Theory of planned behaviour yielded very solid evidence for the structure of our types. The question of using the internet or not is obviously strongly connected to the attitude towards the internet, behavioural control and the influence of significant others e.g. primary and secondary reference groups. According to theories of socialization the latter have more influence on our attitudes and behaviour than the first group. The Theory of planned behaviour can be seen as a piece of a larger theoretical framework which tries to explain complex social phenomena on a macro level. In our opinion, the consideration of the micro level is vital in explaining phenomena like the digital divide. Each individual is led by a complex process in decision making considering whether to use the internet or not. Demographics (as basic constraints), attitudes and our social environment play a major role in this decision which is formulated in a very realistic way in the Theory of planned behaviour.

This theory also allows us to identify major starting points in trying to bring more people to the net. Especially the role of the social environment has to be emphasized in this context. Salient reference groups serve as mulitplicators towards attitude change and subsequently to behaviour change. If our friends tell us that the internet is a good, useful and time-saving activity (as we have seen in our semantic differential analysis) we have more reason to give it a try. This fact is known ever since attitude theory was employed (first Hovland and Weiss 1951, Beninnghaus 1976). The credibility of our friends and family is highest in decision making situations. And even more we learn our behaviour in our families, which means if internet usage is natural for our parents we are also likely to do so.

Our typology can serve as basis for practitioners' work and shows also the importance of computer literacy as a fact which makes computer usage easier and heightens interest in using the internet. If this basis is not provided, the internet seems difficult and unsafe to our respondents or even "dangerous" and "supernatural". Self efficacy plays a vital role in this context as Stanley (2003) has found in her study.

In citing Lazarsfeld (1972) we finally want to open our typology for discussion: "*The problem comes up whether to every given system of types there corresponds only one attribute space and one mode of reduction. The answer is probably "no".*" We have tried to link empirical evidence with a theoretical background whilst building a meaningful and reasonable classification of user types. Further research could improve our approach in applying multivariate methods like structural equation modelling which has been proved to be a useful method in testing the assumptions of Ajzens Theory of planned behaviour (Levine 1998, Welker 2001).Observing the development of a technical innovation is a process which needs to be continued over a large period of time, ideally using meta analysis (Dewan and Riggins 2005) or even longitudinal data to get a complete picture about the diffusion of innovations.

Survey methods can help us to get knowledge about general distributions and attitude patterns in society. If we want to get a deeper knowledge and substantial understanding of our types we clearly have to apply qualitative methods like in-depth interviews and/or discussions with focus groups. Expert interviews can help to complete our picture and can give hints about knowledge gaps about target groups on both sides: the researches and the experts. In this sense, our concluding remarks can be seen as plea to use more triangulative approaches to overcome the shortcomings of both: the quantitative and the qualitative research approach.

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Appendix

Crosstabulation used as a basis for typology building

Internet usage	Users (N=367)	Non-Users (N=160)
Place of access		
access at home	138	0
access at work	36	0
acess at home&work	165	0
access at friends home	28	0
Intentions to get online		
plans to get online	0	36
no plans to get online	0	124
	367	160